Scientific Inquiry

4-1 The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation.

4-1.4 Distinguish among observations, predictions, and inferences.
Taxonomy Level: 4.1-B Analyze Conceptual Knowledge

Previous/Future knowledge: In kindergarten, students identified observed objects or events by using the senses (K-1.1) and predicted and explained information or events based on observation or previous experience (K-1.3). In 2nd (2-1.4), students inferred explanations regarding scientific observations and experiences. In 3rd grade, students predict outcomes of simple investigations (3-1.4) and inferred meaning from data communicated in graphs, tables, and diagrams (3-1.6).

It is essential for students to know how to distinguish among observations, predictions, and inferences. Observing, predicting, and inferring are interrelated skills.

- *Observation*— qualitative and quantitative information gained by carefully identifying and describing properties using the five senses or scientific tools.
- *Prediction*— an inference made about what will happen in the future; it is based on observations, available data, and prior knowledge. A prediction is not a guess.
- *Inference*—an explanation or interpretation of an observation based on prior experiences or facts. They are not final explanations of the observation. There may be several logical inferences for a given observation. There is no way to be sure which inference best explains the observation without further investigation.

For example, the following observation, prediction and inference were made about this picture.

- Observation: The elephants are facing each other.
- Prediction: The elephants are going to fight.
- Inference: The elephants are mad at each other.

Scientists use these skills to make sense of the world. As new observations are made, inferences are proposed to explain what has been observed and what has not yet been observed. Inferences that state what has not yet been observed are called predictions.

It is not essential for students to formulate a hypothesis as a prediction.

Assessment Guidelines:
The objective of this indicator is to *distinguish* among observations, predictions, and inferences; therefore, the primary focus of assessment should be to determine how observations, predictions, and inferences relate to one another. However, appropriate assessments should also require students to *identify* or *classify* a statement as an observation, prediction, or inference; or *exemplify* an observation, prediction, or inference.